

KILMER (F.B.)

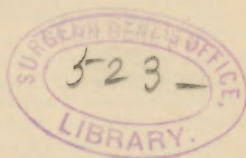
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Bissy Nuts;

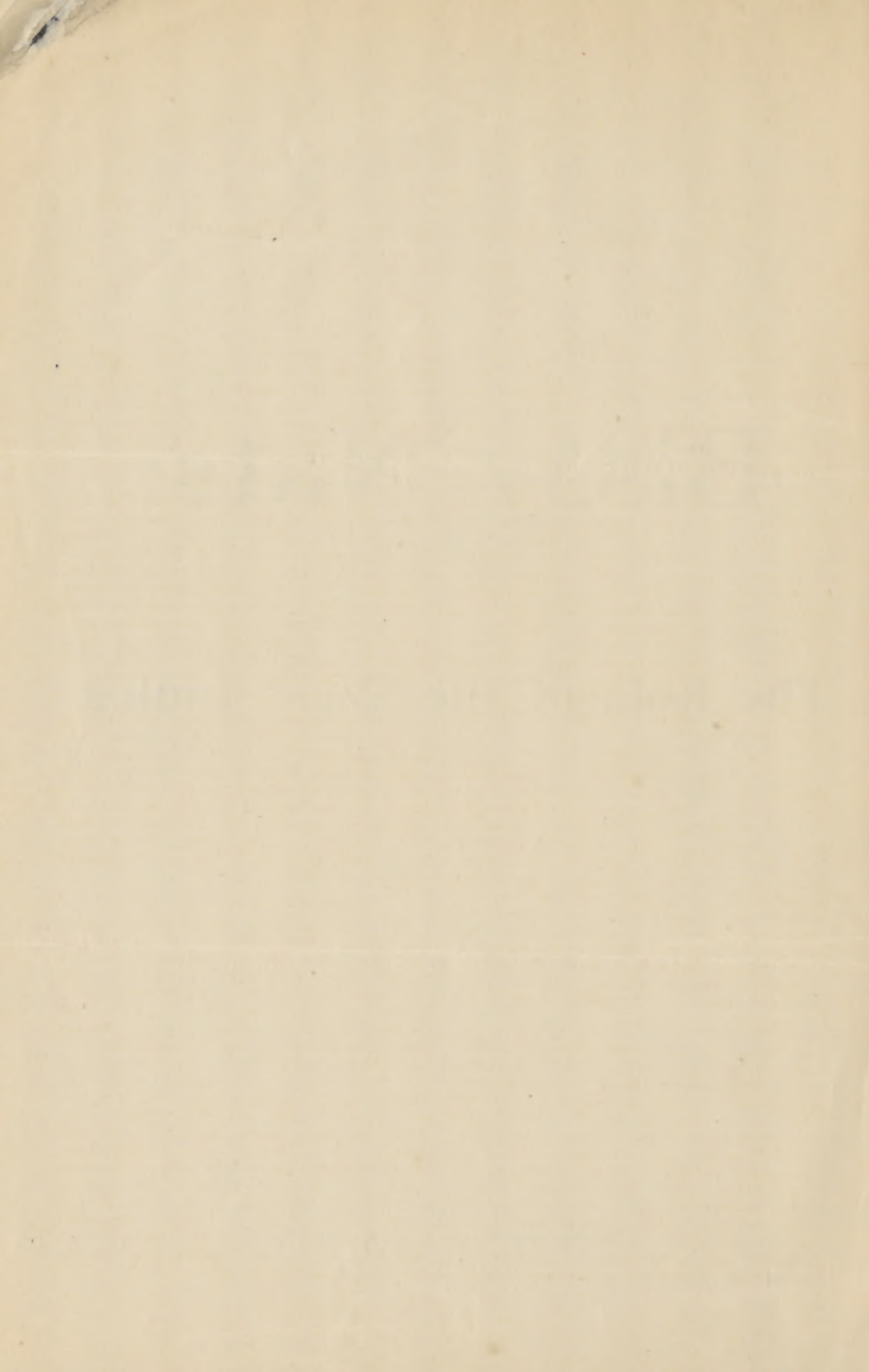
The Kola of the West Indies.

— BY —

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BISSY NUTS; THE KOLA OF THE WEST INDIES.

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The African slave traders who peopled the West Indies with Gold Coast negroes, brought with them the seeds of the *Cola acuminata* a plant which served to ameliorate the condition of the slave, and has since contributed greatly to the comfort and welfare of his descendants.

ITS INTRODUCTION INTO THE WEST INDIES.

The introduction of this *Sterculia* into the West Indies was long enough ago for the plant to become naturalized and its name changed to Bissy (or Bissi). The African designations are unknown in these countries. The term "Kola" has very recently come into use in some of the English islands. Its native name is derived from the name of its first planter, Daniels and others attributing its introduction into these islands to a Guinea slave trader named Biche or Bassai, in 1630-40. It has therefore had the advantage of several centuries of cultivation under favorable conditions of soil and climate.

ITS HABITAT.

The geographical limits of the *Cola acuminata* in the West Indies cannot be accurately defined. My records and investigations show that it is found in Cuba, Jamaica, and Porto Rico, and more or less frequently in the Leeward islands and the Windward islands as far as Trinidad. Occasional plants have been noted along the coast of Brazil north of the Amazon, in the Guianas, Venezuela about Colon, and isolated here and there along the islands and coasts of Costa Rica, Nicaragua and Honduras. Wherever bananas, nutmeg or cocoa grow, kola will flourish and is generally found.

DESCRIPTION OF THE KOLA TREE.

Although there are many species of *Sterculia* to be found in the West Indies, the *Cola acuminata* was the only kola observed. It is too well known to need much description. In its general appearance a kola tree may be said to resemble the horse chestnut or the tropical orange. The tree grows to a height of 20 to 40 feet, and is valuable for timber, ornament and shade. It begins to bear fruit when about five years' old and comes into full bearing in nine or ten years, producing two crops annually, one in midsummer and one in late winter. The yield varies considerably,

according to the soil and location. The kola thrives best in well watered and storm sheltered spots, where the soil is deep, rich and of a clayey character. It is a hardy tree and flourishes throughout an extensive territory and a wide range of temperature, being occasionally found in an altitude of 3,000 to 5,000 feet.

AGE OF THE TREE.

The age of the tree is indefinite; in certain instances it has been known to bear well for fifty years successively. It has been propagated mostly by self-sowing, or a here and there planting by the natives. But since its commercial value has come into recognition its cultivation has assumed a new importance and the government gardens furnish the seeds and young plants in large quantities; some governments are even offering bounties for its cultivation.

THE YIELD OF CROP.

Under favorable conditions its yield is large. Each fertile flower produces five pods and each pod five or more seeds. A quart of seeds, or nuts, weighing one and a half pounds, are sometimes gathered from a single flower, and it is not unusual to secure one hundred to one hundred and fifty pounds from one tree, the average crop being from seven to ten thousand pounds per acre.

THE COLLECTION OF THE NUTS.

The bissy gatherer has little knowledge concerning the constituents of the nuts, or for what uses they are required in far off lands. Those gathered for his own or for the use of the native physicians are sorted and prepared with considerable care; but those intended for export seem to receive very little attention, and anything that will pass in the market goes. The nuts sent to the markets are frequently mildewed, mouldy and partially decomposed. The volatile constituents, glucosides and other principles, have become dissipated or transformed, the delicate ferment power has acted, to a greater or less degree; fermentation and bacterial diseases have set in and produced marked changes; finally the whole has dried into a lump of vegetable horn, bitter and rank to the taste, and with but little virtue, aside from the varying amount of caffeine it may contain.

It was not a matter of wonder to me, after living among such drug collectors, that a delicate drug, like kola, should prove disappointing when it reached the American practitioner. On the other hand, it is a matter of surprise that drugs supplied by these unskilled natives should be of any value as remedial agents containing, as they often do, sensitive glucosides, alkaloids and volatile principles, which require intelligent handling if they are to be preserved in their original form and without loss of efficiency.

SKILL OF THE NATIVE COLLECTORS.

I spent some time under the tutelage of the native collectors who have acquired a reputation for their skill in preparing and curing

and furnishes the indication that these rude and simple people have somehow acquired habits of extreme care and excessive caution.

THE DIFFERENT VARIETIES OF KOLA.

Some differences of opinion exist among the natives as to the relative value of kola raised in different localities, and variation in the size and form of the flowers and seed. The number of cotyledons in the *Cola acuminata* varies from two to five; and those containing the larger number are considered the best. The white nuts are also considered preferable. But until the exact nature of the active principle of the plant is more clearly known, these points cannot be accurately determined. So far



BRANCH AND FRUIT OF THE WEST INDIAN KOLA.

bissy nuts. For chewing and certain other purposes the products of their hands commands an unusually high price. Their secret consists of expert knowledge coupled with the exercise of extraordinary care. They select the nuts from healthy trees, the location, quality of the soil, color of the nut, etc., entering into their calculations. Only thoroughly matured nuts and perfect specimens are used, and the collectors are trained to detect the smallest spot or blemish in the nuts; the slightest evidence of decay, softness or lack of color and rotundity being sufficient to cause their rejection. After being scrupulously cleansed, and while still moist, the perfect nuts are placed upon leaves in a small dug-out in the earth. The great care taken to prevent change or damage by bruising, moulding, mildew or the action of the sun, air and moisture is noticeable,

as I could decide, many of these differences were immaterial.

AS USED BY THE NATIVES.

In its African home the kola is surrounded by symbolism and endowed with miraculous power and divine attributes. It has lost these in gaining a foothold in the Antilles, but has acquired an important place as a domestic remedy and as a sustaining beverage. Among the natives the most common use of kola is for chewing. The undried nut is used, the juice being swallowed and the fibrous portion rejected. The nut or fruit is simply taken from the pod, washed and wrapped in a leaf or placed in a pouch or box to exclude the air, retain the moisture and prevent change. The "burden bearers" and field laborers, both male and

female, follow this practice, and marvellous stories are told of the value of this stimulant and nutrient in preventing tissue waste and enabling the laborer to perform, without fatigue, exhausting work under a blazing sky with but little or no food or drink. Energy is not supposed to be a prominent characteristic of the West Indies, but it is, nevertheless, true that the natives frequently undergo arduous and long-continued labor with the help of bissy nuts, and perform feats of endurance which would be trying in a cooler climate. A bit of salt fish, a piece of roasted yam or cassava and bissy is a day's ration; on this they tirelessly toil in the broiling sun, cutting cane, making roads, mowing and carrying heavy loads, apparently no more exhausted at night than when the day dawned and keep this up year after year. Bissy users seem to never wear out from overwork; decrepit and broken down old men and women are not seen. In addition to its use in sustaining strength it is reputed to possess tonic qualities of especial value in the weakness and debility which follow low fevers and long illness. In such cases it is prescribed as nourishment, to be chewed freely or made into a drink with milk, honey or the juices of fruit. Physicians told me that in cases where patients had loathed food they could retain milk and broths on the addition of kola.

KOLA BEVERAGES.

Kola beverages in the shape of bissy tea (prepared similar to tea, coffee and chocolate, or in connection with them), kola champagnes, kola ale, kola cordials, bitters and wines containing alcohol are in universal use. They are served in restaurants, at the family table, as morning "bracers" in the rum shops, stores, markets and wayside stalls. These compounds are important articles of commerce, entering into domestic import and export trade. The only institutions I saw that could claim the dignity of factories were devoted to the preparation of kola.

KOLA SUPERIOR TO COFFEE.

Coffee is not regarded as conducive to health in this climate, and, in fact, in all climates people might properly exercise more discretion in its use. Tea is expensive in the West Indies, spirituous and malt liquors are disastrous in their effects both to the Northern man and the native born; hence the popularity of kola in its various forms, as a substitute for coffee, tea and alcoholic stimulants. The disordered digestion and nervous disturbances attendant upon coffee drinking, the dyspepsia, tremulousness and other symptoms which follow the inordinate use of tea, are not to be noticed in kola users. Its effects are bodily and mental stimulation, and capacity to expend energy without waste or fatigue. Its slight sedative action produces content

and restfulness, and unlike other stimulants, it leaves behind no reaction or depression. Many professional men assured me that these kola beverages were their "sheet anchor." There seems to be some propriety, therefore, in the circular which a West India manufacturer of kola handed me, wherein were enumerated as those who are benefited by using it, the following:

"Ministers of the Gospel, after exhaustive sermons; doctors after exciting amputations; editors after gathering the scandal of the day; schoolmasters after thrashing dunces; scholars, "before and after" examinations; postmasters, after deciphering misdirected letters; carriage builders, after competing with Yankee buggies; custom house agents, after trying to make importers pay duty on free goods; governors, after blowing their own trumpets; treasury clerks, after counting petty cash; bankers, after wrestling with financial problems; politicians, after forgetting their promises; women during the season of house-cleaning; anybody and everybody who is struggling through this weary world."

ITS SUSTAINING PROPERTIES.

From personal experience I can vouch for some of the reputed qualities and effects of kola. Coming from the North I found "old Sol" very young and active in the tropics. Exposure to his rays speedily enervates one and frequent siestas are necessary.

When I became a kola user this condition of affairs was changed and I found I could display as much energy, to say the least as those to the manner born. I was soon able to dispense with between-meal lunches, and if necessary, the mid-morning breakfast, without inconvenience. On several occasions I made expeditions into the country where it was impossible to obtain food without considerable trouble and delay. Most of these days were spent in riding a mule in bridle paths up and down the bare mountains, undergoing constant exposure to the direct rays, of the sun, and it frequently happened that a cup of kola in the morning with some bits of bread would be my only food and drink until the evening dinner, save the bissy nuts I chewed.

KOLA REPLACES SLEEP.

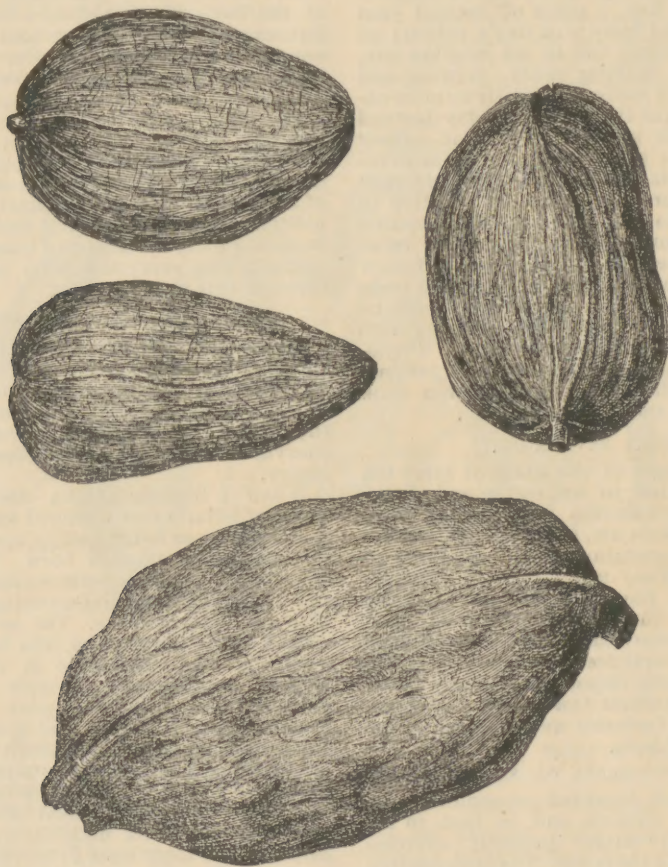
There is among the natives an old saw to the effect: "Experience teacheth that the bissy eaten in the evening hindereth sleep," and I am aware of its truthfulness. There is no sleep after a good allowance of kola taken at night, and yet the wakefulness it produces is not the irritating restlessness such as is caused by drinking too much tea or coffee. Under the influence of kola one is cheerful, tranquil, even energetic. One can read, talk, write, work, or play all night, but sleep will not come. A sleepless night occasioned by indulging in

tea, coffee, or other stimulants leaves one nervous, fretful and exhausted, but with a wakeful night under bissey one only feels chagrined at the loss of a tropical night's delightful sleep.

NATIVE REPUTATION OF THE KOLA.

In West India native materia medica the bissey nut is considered a most important agent, superior to coca and rivaling their famous panacea "Bush Tea." Its slight bitterness gives it the action of a bitter

efficacious in infectious diseases and a remedy for inebriety. Some of these notions are well founded, others are probably mythical. Against poison and infection, it can only be of indirect benefit, but for inebriety it is certainly effectual. A liberal dose of it will sober a drunken negro in half an hour. It is also claimed that if a man chew bissey, he can at the same time drink rum *ad libitum* without becoming intoxicated. After the peculiar orgies and periods of debauching to which some of the natives



AFRICAN KOLA NUTS IN OUTER SHELL.

tonic and in addition it seems to give a decided zest to food and drink. Resident physicians testify that it stimulates the flow of gastric juice and thus aids digestion. They also claim that it gives relief in cases where food resting heavily in the alimentary canal has decomposed and fermented. In the native therapeutics it is reputed to possess virtues as an antidote for poisons and in many huts a tincture of bissey nuts in rum is kept macerating against the time of need. It is also thought to be

are addicted, its effects are certainly very striking and efficient. After many days and nights of indulgence and excesses by the free use of bissey they turn up fresh and and vigorous.

DESCRIPTION OF THE KOLA NUT.

The fresh nuts divested of all pericarp weigh from 85 to as high as 575 grains (46 to 57 per cent. of which is moisture). The skin covering is very smooth, polished, close in texture, tough and wiry, closely adherent

to the substance of the nut. The epidermis is either a light violet, a pink-rose, or a yellowish-white in color; sometimes the yellowish-white are found in the same pods as those of other colors. The true coloring matter seems to reside chiefly in the skin. From this coloring matter, and probably from coloring matter arising from a further decomposition of the nut, the natives prepare a dye. On cutting or breaking the skin by even so light a puncture as a pin point so as to admit the air, a yellow spot is immediately formed, changing rapidly to brown wherever the air has penetrated. This coloration forms more rapidly in the sunlight; this change also takes place upon drying the nut even when care is taken to keep the skin unbroken. This action is doubtless due to a splitting up and oxidation of the glucosidal constituents and seems to in some way be aided by the action of the ferment of the kola.

CONSTITUENTS OF KOLA.

Within the nut is a mucilaginous sub-

only give traces of alkaloid, and it is questionable if in unripe kola any free caffeine exists as such. The caffeic constituents of the kola in the fresh nuts reside in a glucosidal body. By the decomposition of this glucosidal body in the ripening of the nuts and its subsequent handling and drying, caffeine is formed.

At the time of my experiments I was not aware of the works of Knebel and Heckel, who had separated from dried kola a substance which Heckel called kola red, and which Knebel called kolanine. The glucoside, as found in the fresh kola, evidently differs from these substances. Their experiments were conducted with dried kola, where no doubt this glucoside had become partially broken up and changed by the action of oxygen, zymolysis and other causes.

THE ACTIVE PRINCIPLE.

This glucosidal principle extracted from the nut by alcohol (after previously extracting the free caffeine by chloroform) produces, when taken into the system,



A PILE OF BISSY NUTS (WEST INDIAN KOLA) DEPRIVED OF THE OUTER SHELL.

stance, not abundant, but enough to be noticeable.

Separated and dried the gum seems, as might be expected, slightly the nature of a bassorin gum. The entire cotyledon is solid and tough, consisting of starch cells surrounded by cellulose walls. Extraction of the fresh kola with chloroform gives an extract consisting of traces of resinous matter, tannin and fatty matter. Upon diluting with hot water a faint aromatic odor resembling cacao butter is evolved, due probably to the presence of the essential oil. Some coloring matter is found, but only when the operation is not conducted with proper precautions.

ALKALOIDAL CONTENTS.

The amount of alkaloids obtained by direct extraction of fresh kola by chloroform, gave an amount ranging from .05 to one-tenth of one per cent. free caffeine. In nuts not fully mature the first extractions would

all of the marked effects which are attributed to the use of kola; in fact, more marked action than many of the reported actions of alcoholic preparations of kola made from the dried drug. Quite similar results follow the mastication of kola from which the alkaloids have been extracted by chloroform, showing that after the extraction of the already formed free alkaloids, there remains a principle which has the same waste-preventing and stimulating properties as the entire nut.

KOLAZYM, A NEW DIASTIC FERMENT.

This glucosidal body is very easily decomposed in water, acids and alkalies, and among the bodies evolved in its final transformation is caffeine. Heckel has shown that the substance he named "kola red" contained in some instances as high as 83 per cent. of what he calls nascent caffeine. His substance "kola red" and Knebel's "kolanine" are probably bodies formed in

the progressive steps of the transformation. There is also present in the kola a diastasic ferment power which, for convenience, I have termed "kalazym." This ferment in addition to a diastasic action on starch is also a glucosidal splitting ferment.

THE FUNCTIONS OF KOLAZYM.

The office of this ferment in the plant economy is very obscure, but it probably has to do with the change that takes place in the ripening nut whereby the carbohydrates and nitrogenous elements are transformed into glucosides, and eventually alkaloids and glucose. This ferment within the nut with the air excluded, either from the natural conditions which surround it or from some other cause acts very slowly. But in contact with the air, or in suitable media, its action is more or less rapid, and during its action products are formed which seem to be suitable soil for air and mould germs, so that these last finally seem to overcome the action of the kolazym, or, at least, to inhibit it, and these mould germs carry on a farther decomposition of the gums, starch cells, the glucosides and alkaloidal constituents present. The presence in the fresh nut of this glucoside and enzyme explains the changes which take place when the nut is chewed. The taste of the nut when first bitten into is rather astringent and bitter; this, under the action of saliva, probably aided by the action of the kolazym, rapidly changes to a sweet. Thus it can be reasoned that in the native process of mastication the glucoside is broken up, or partially so, and glucose and alkaloids are evolved.

To this slow transformation of the kola by the breaking up of the glucoside is the marked difference and probable superior-

ity of kola over other caffeic drugs which contain only free caffeine.

I have not here intended to present any full or detailed results of my study, nor can completeness be claimed. Since my return I have continued my investigations aided by many experts, who will report their conclusions at a later date. I have also placed extractions of the drug in various menstrua in the hands of physicians for clinical trial.

THE KOLA OF THE MARKET INFERIOR TO BISSY.

There are many interesting problems yet unsolved. However, so far as results have been obtained. I am convinced that my observations in the Antilles were in the main correct, and that the kola, as known in the market, does not properly represent the bissy used by the West Indians. I believe I am warranted in saying that it is an almost different drug, and this may account for its limited use in this country. My convictions are strong that all medicinal preparations of kola should be made from the undried and unchanged nuts, and that the more carefully they are selected and handled, and the quicker their constituents are extracted, the more marked and efficient will be their medical action. How far this may apply to other drugs is a problem worth of extended study.

Whether the kola in any form is of any remedial value is for the physician to decide, and a correct conclusion can be arrived at only when the action of bissy or kola, in its habitat, can be reproduced in the United States. To strive to accomplish this is within the province of Pharmacy.

As an humble contribution toward this achievement, I offer these observations on "Bissy Nuts, the Kola of the West Indies."